Electricity on the Farm

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MARCH
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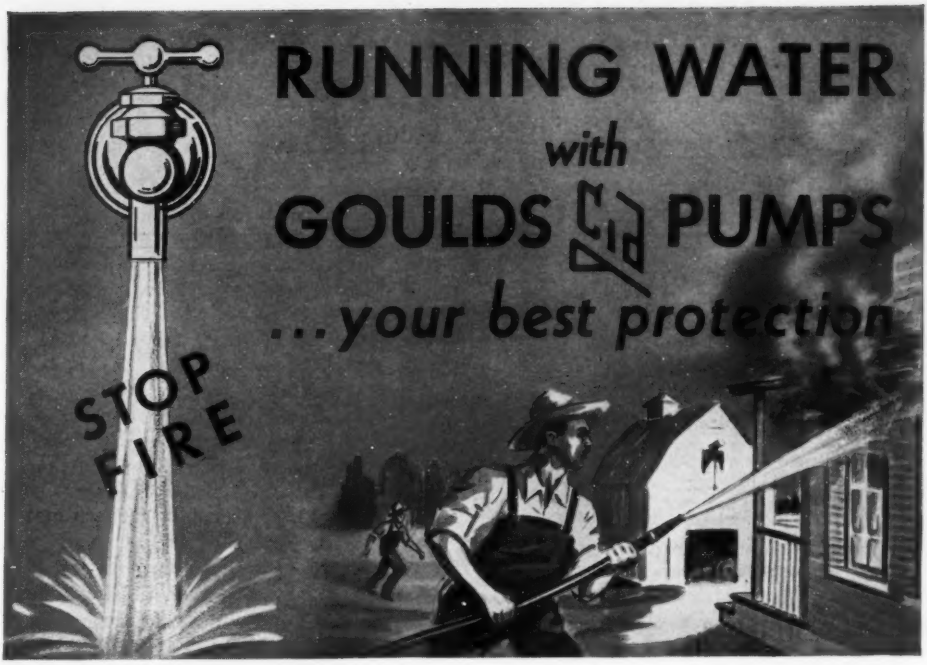

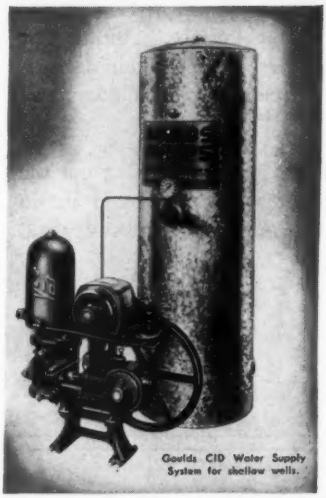
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March, 1937

Electricity on the Farm

Vol. 10, No. 3

EDITORIAL

SMOOTHING OUT THE SEASONS

With the advent of winter the hours of daylight are reduced, temperatures drop, and nature retires to her long sleep.

Before the advent of electricity, those living on farms could do nothing about it. Today, the situation is different.

Not only the home, but barns, yards and poultry houses today employ "artificial daylight" to lengthen the day. Plants are started earlier and flowers are brought to bloom in off season by the aid of electricity.

Egg production is increased in the months when it was normally low through the use of electric lighting, and eggs can be hatched and chicks brooded whenever it is desired, by the use of modern electrical equipment.

The temperature within the home, where heated by a central heating system, can be maintained at a fairly constant temperature by use of thermostats which control the furnace. And in hot summer, electrical air conditioning systems can even out the high midday temperatures.

Truly, electricity is smoothing out the seasons where it is called upon to do those tasks it can perform effectively and profitably.

FRED SHEPPERD.

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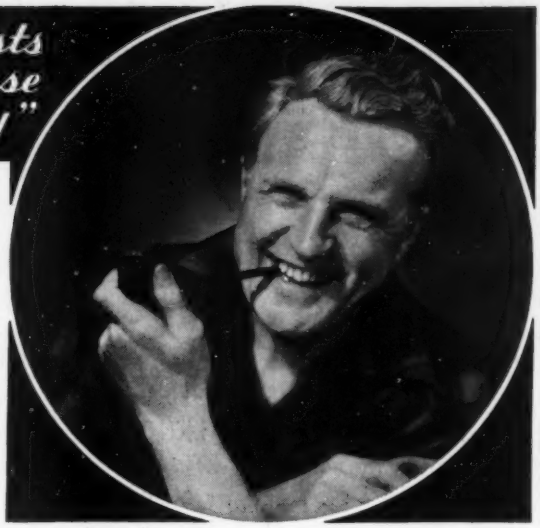
"our MYERS *costs us nothing because it earns us money"*



READERS of this magazine have received ample evidence as to what the installation of running water in house and outbuildings accomplishes on the farm—how it opens up new sources of income by the time it saves, the work it does, the increased productivity and higher gradings it makes possible. No water system you can select will do more for you in this regard than a reliable MYERS. The very high quality of design and construction in MYERS Water Systems brings not only remarkable durability, but maximum economy. Many a MYERS owner has discovered that his water system ***actually earns more*** than it costs for total maintenance and operation. In other words, he and his family enjoy, ***practically free of charge,*** all the personal comfort, convenience and sanitation that running water brings them. The longer you delay putting in a MYERS Water System, the more you are missing in life. Decide now to find out all you can about this wise investment.

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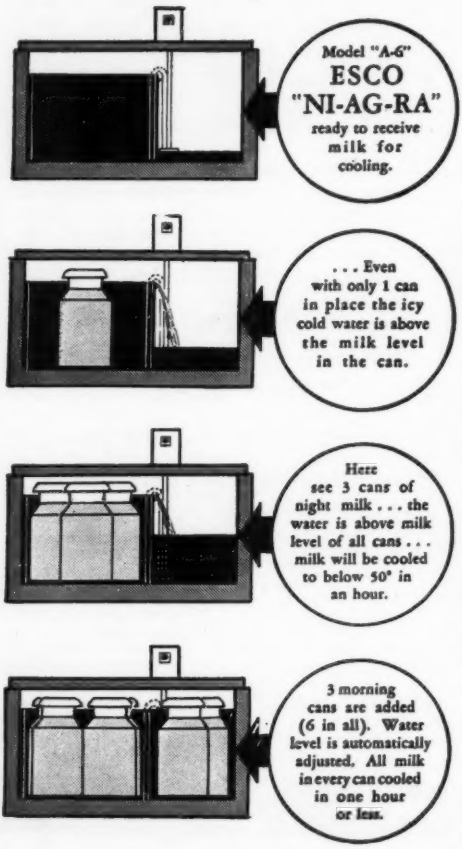
Model "A-6"
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ready to receive milk for cooling.
. . . Even with only 1 can in place the icy cold water is above the milk level in the can.
Here see 3 cans of night milk . . . the water is above milk level of all cans . . . milk will be cooled to below 50° in an hour.
3 morning cans are added (6 in all). Water level is automatically adjusted. All milk in every can cooled in one hour or less.

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ICY COLD WATER is always above the milk level of the cans . . . whether you have one can in the cooler or whether it is filled to capacity.

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Get New Esco Booklet. . . . Tells why the New Esco "NI-AG-RA" will cool your milk with LESS WORK . . . and at LESS COST.

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Mr. Santon with three of his electrically heated hot-beds. The one next to the building was the first one converted to electric heat in 1933.

THERE'S PROFIT IN SOIL HEATING FOR THE SMALL GROWER

By LAWRENCE E. GOBLE

ELECTRIC heat is replacing manure for heating hot beds throughout the Middle West. The large vegetable grower has been recognizing its advantages. Now the small grower with a so-called "patch" is making a profit growing sturdy plants for his own use and for sale to his neighbors.

The experience of Isaac Santon of Bluffton, Indiana, is typical. In 1932 he read of some large growers who had successfully grown plants in electrically heated beds on a large scale. Good manure without cornstalks was increasingly difficult to obtain. The temperature was not easily controlled and there was considerable labor involved in getting the manure beds ready.

Since practically all of his income was derived from the growing of flowers and vegetables, the cost had to be considered. He could not afford an expensive experiment. As he went about his pruning of grape vines and orchard trees for his neighbors, his mind was almost constantly on this new method of heating. The thought crystallized into an idea, the idea into action. He decided to try one bed for the 1933 crop.

Just south of an out-building in his back yard was a six by nine foot bed which was chosen for this transformation. He purchased sixty feet of number nineteen lead covered soil heating cable and a thermostat. He made slight changes in the bed so that the sash would fit into rather than onto the top of the bed. This was in the interest of economy for it kept out the wintry winds, thereby reducing the operating cost.

Since there were no drainage facilities the bed was built almost wholly on top of the ground. However, he banked it well with corn fodder and reduced the loss of heat through the sides.

Mr. Santon had had no experience in laying cable and no one to instruct him. The distribution of the cable could have been improved upon. After it was covered with about four inches of dirt which he had previously sterilized he found that it terminated at opposite ends of the bed. This made it necessary to run a feed wire half way around the bed.

After running a two-wire 15 volt service to the adjacent shed, thence down to the bed, he turned on the energy. Then after allowing the soil to become thoroughly heated he spent the next few days getting the thermostat adjusted to maintain

Above: A heated (left) and unheated (right) row of celery on the Sweet Celery Farm. Heating cable will be used for open field heating on the Sweet Farm in 1937 for the third time.

Below: A cold frame with pansies growing in December. Cable is used here only for frost protection.

the desired temperature. Indicating thermostats were not available in those days.

He sowed the bed to a variety of vegetables; tomatoes, pimientos, eggplant, celery, and cabbage.

This first planting was not only successful but profitable. When the word was passed around that Isaac Santon had gone plumb cuckoo and was trying to grow plants with electricity, the curious ventured in to see what it was all about. The advertising value of his venture was in itself worth the cost. He sold all his surplus plants and could have sold more. He had a splendid opportunity to compare the plants with those grown in the manure beds. They were superior in every way. He had absolute control of the growth and also of the hardening off period. When transplanted they did

Mr. Lanternier of Fort Wayne looks over a luxuriant growth of sweet potato plants produced with electric heat. More than thirty dollars worth of slips were sold from this bench. Electric heat cost was five dollars and ninety cents.

better than those grown in the adjoining manure bed. All this for a total of one hundred fifty three kilowatt hours.

In order to take care of customers, Mr. Santon added a bed in 1934, with the same satisfactory results. Again he was unable to produce enough plants to take care of the customers who preferred the plants from the electric beds. In 1935 he added another.

He now sets a bed to pansies in October and resets in flats in December showing a further profit. For this growing he does not need the under heat but can suspend a line of cable all around the bed with the thermostat held supported in the air and set so that it will maintain a temperature high enough for frost protection. This takes very little energy, and is worth all it costs as insurance against frost.

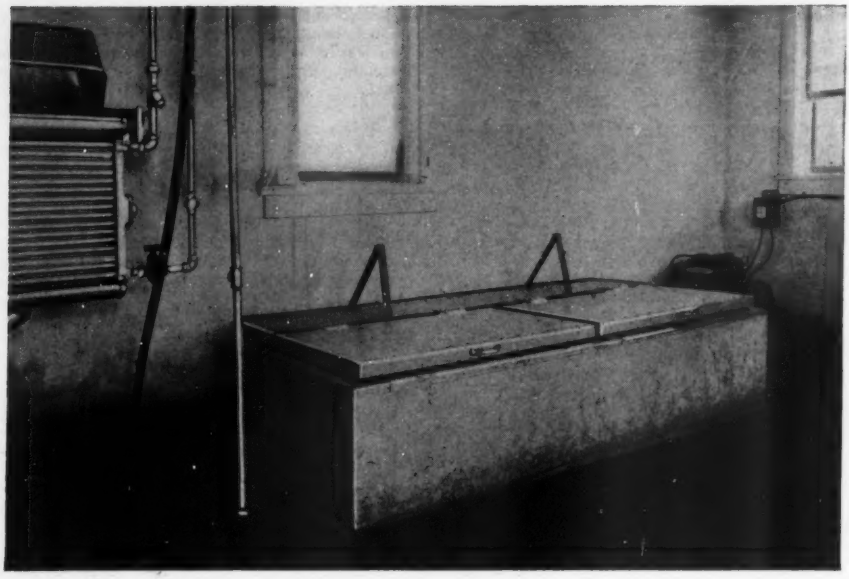
In 1936 Mr. Santon was still growing his sweet potatoes in a manure bed. Some severe weather late in the season, after the heat from the manure was exhausted caused him a loss equal to the cost of electrifying the bed. So for 1937 Mr. Santon's beds will be 100% electric.

He attributes his success in the field to the accurate temperature control possible with the thermostat. He says that although the thermostat is the most expensive single item in the construction of an electric hot bed, it is worth its weight in gold. It is a watchman that never fails. It saves money because it will not allow the cable to consume energy unless it is needed. It prevents too high temperatures with resultant spindling growth. It eliminates the human element in temperature control. It saves time and worry for the operator.

In one case, not many miles from the above installation, there was a comparable set-up with no thermostat. An entire planting was lost because the operator forgot to turn off the current.

In another installation consisting of one hundred and twenty feet of cable and a thermostat, more than thirty dollars worth of sweet potato plants were sold from a bench twenty feet long. The energy cost was five dollars and ninety cents. The growth was luxuriant and the slips were sturdy. Many of them were sold before those produced by manure beds were available.

It is evident from the experiences of these growers that one does not have to spend a lot of money on special bed construction to produce satisfactory results. Also that if thermostats are used the labor and the energy costs are low. Where rates are at all favorable and one exercises a reasonable amount of intelligence in handling electric beds, they are far more satisfactory than the manure. Hence there will be continued rapid acceptance of electric heat for hot beds, cold frames and benches. It may not be very long until outdoor heating of certain vegetable crops in the field will be practical and profitable.



MILK COOLING IS PROFITABLE

By JOHN E. NICHOLAS

As a nation, the United States of America leads in recognizing the importance of milk and its products in the human diet. We have become conscious in quality products and the consumers are keenly interested in the subject of high quality milk which is "food for all ages." It is both good management and investment to produce quality milk because this automatically increases the number of consumers and builds a high standard of quality guarantee in the mind of the consumer, who spreads the gospel to his friends.

Milk is a highly perishable product and the public has been made to realize that this wholesome food demands very careful handling from the time it is produced until it is consumed. The producers in cooperation with the distributors have pooled their efforts to provide the public with high quality milk. More than half of all human food may be classed as perishable, and thus, subject to preservation by various degrees of refrigeration, with economy, nutrition and marketability taken into account. There are very few products for which refrigeration cannot supply suitable technique.

It is now common knowledge that milk comes from a healthy herd, produced under careful and sanitary conditions, may not, in many cases, reach the ultimate consumer for as long as thirty hours. The most important factor which controls the high initial quality of the milk for a long period of time is low temperature, to which all fresh milk should be cooled soon after it is produced.

Many distributors have definite standards which the producer is required to meet and, once having fulfilled this requirement, receives additional monetary premium for his efforts on the quality program.

There are perhaps many acceptable methods in quality classification. The premium for Grade A fluid milk for human consumption, having less than 10,000 bacteria per cubic centimeter, may be as high as forty cents per hundred pounds.

The next grade, having a bacteria count of 10,000 to 50,000, brings a lower premium of probably 25 cents per hundred pounds. Either premium is basically a sound incentive to encourage the production of high quality milk which requires no more additional time or energy other than scrupulous care and proper equipment which will guarantee to maintain the necessary temperature conditions essential to guard against and prevent the multiplication of the ever present bacteria.

It is undoubtedly true that some producer still holds to the idea that milk may be cooled by placing the cans in a running spring. But in general it is found that the springs which are claimed to be ice cold are usually as high as 65 degrees F., especially in the summer, and sometimes the water must be piped, so that its temperature may rise 20 degrees before it enters the cooling tank. It is not, therefore, difficult to realize that the methods which have been practiced in the past and apparently found satisfactory are unsatisfactory now.

Mechanical refrigeration takes out the guesswork in milk cooling, and electrically operated milk refrigerators assure positive low temperatures; they are controllable, automatic, the icing job is elim-

inated, the cooling water is always cold, always ready for use, and the cost of operation and maintenance much lower than with the use of ice.

There are a number of types of satisfactory milk coolers on the market, and the dairyman who is considering the purchase of a milk cooling unit should first consider the market requirements which he must meet.

The most feasible and satisfactory method of cooling milk on the farm is one which requires the least amount of attention and where milk is not exposed to outside contamination. It is the immersion method in which the milk cans are placed in mechanically refrigerated water cooled by electrically driven machines automatically controlled. It is very important that milk should be cooled promptly, quickly and uniformly.

There are several factors that the milk producer should consider in his problem of milk cooling. It is difficult to realize that the methods which have been practiced in the past and apparently were adequate then are inadequate now. Today there is an agreement that all milk intended for human consumption should be cooled immediately after it is produced to a lower temperature, preferably 45 degrees F.

Cooling may be accomplished by placing the milk cans directly in the cooling water or by pouring the milk over the aerator. The aeration method requires extra handling and is desirable only when the milk is bottled, as in the case of the retail dairymen who require dry storage boxes. The wholesale milk producer will find it more expedient to use the direct immersion method.

To cool milk by direct immersion, well water or even spring water is not cold enough, especially during the summer months when cooling is a much more important problem than in the winter. Ice or mechanical refrigeration, when properly applied, will cool milk satisfactory and economically.

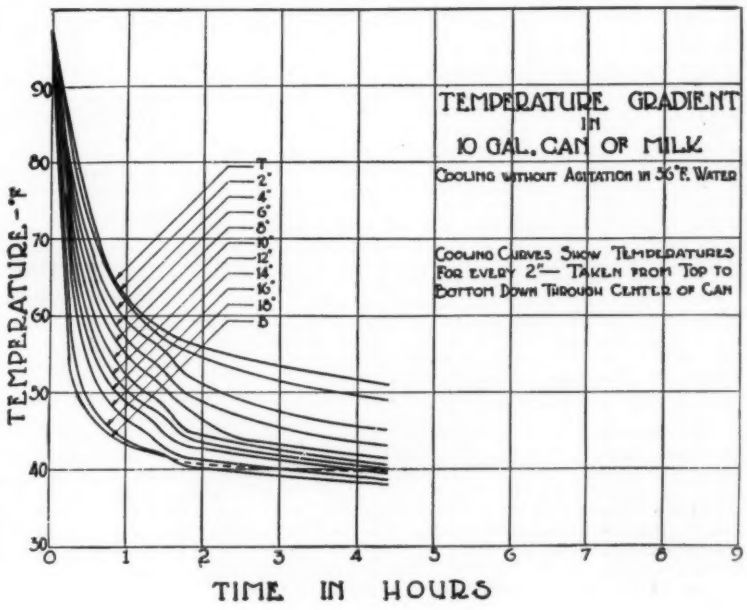
Aside from cooling, there are two items in handling milk which are frequently forgotten, yet which are important when economy of operation is taken into consideration. The can in which the milk is cooled is an important item, because it constitutes 4.2 per cent of the cooling load. The next item is insulation. All milk cooling tanks or cabinets, whether homemade or commercial, should have not less than the equivalent of 3 inches of water-proof insulation. In a home-made wet storage tank, 6 or 8 inch concrete wall, carefully constructed, is satisfactory as to strength and durability, but if there has been no insulation built into the wall, it will not prevent heat losses. The heat that leaks into a milk cooling tank also is an item of importance; when 3 inches of insulation are used, it is practically 7 per cent of the refrigeration load in the winter and as high as 30 per cent in the summer.

Milk should be cooled as quickly and uniformly as possible. The speed of cooling depends on the amount of water in the tank and its initial temperature. All other factors being equal, the milk cools more uniformly if the cooling water is agitated. If mechanical refrigeration is employed, the cooling water should be kept preferably at 34 degrees F. Under these conditions it will require at least 6 pounds of water for every pound of milk cooled if no ice is available on the cooling coils. Some ice on the coils is an advantage since it will prevent the cooling water from rising too rapidly in temperature after the warm milk cans are placed in the tank, because in melting, every pound of ice absorbs 144 heat units at 32 degrees F., the temperature at which it melts. In other words, a pound of ice used to cool milk is equivalent to 144 pounds of water rising one degree in temperature. If, after melting, it is allowed to rise to 40 degrees F., it will absorb additional 8 heat units.

Importance of Agitation

Figs. 1 and 2 show the temperature of the milk in a 10-gallon can when milk is placed in 36° F. water. There are five gallons of cooling water for

Upper left: Interior of the milk room on the Effertz Brothers farm at Norwood, Minn.



Right: Fig. 1. Showing how milk cools every 2 inches from top to bottom in the same 10-gallon can when the cooling water is not stirred.

This milk cooling equipment was installed on the Dobrydino farm near Easthampton, Mass., to eliminate the heavy work in handling ice. Mr. Dobrydino says: "The savings in time and labor over a period of a few years will pay for the cooler. In addition to these savings, we are saving money on the operating cost of the cooler itself."

each gallon of milk cooled in both cases. The curves show how the milk cools from top to bottom as measured every 2 inches. Fig. 1 shows the results when the water was not stirred. Under this condition, at the end of two hours the bottom of the milk as shown by curve "B" is found to be 40 degrees F., while the top of milk at the same time, shown by curve "T" (Fig. 1) is only 56 degrees F. This is a difference of 16 degrees. From Fig. 2 we find that by the agitation of the cooling water the bottom and top of the milk is 39 degrees and 44.5 degrees F. respectively at the end of the second hour of cooling, giving a difference of only 5.5 degrees. At the end of 4-½ hours, the difference between top and bottom is 3 degrees with agitation and 13 degrees without agitation of the water.

The size and shape of a tank should be carefully considered. A long, very narrow tank is least desirable. A square tank is the most economical from the operating standpoint; it has the least surface therefore requires the least amount of material for an equal volume.

All tanks should have a metal lining. A light gauge metal is not desirable because it bends easily. In handling the cans in or out of the cabinet they are generally rested on the front edge. This should be heavily protected against wear.

The over-flow pipe is placed in one corner; a 1-¼ inch pipe should be used. This permits rapid drainage of water and the tank can be more easily rinsed or hosed off when necessary.

How often should the water be changed? It all depends on the degree of cleanliness practiced by the dairyman. If a can had been in the barn during milking, it may have accidentally picked up foreign

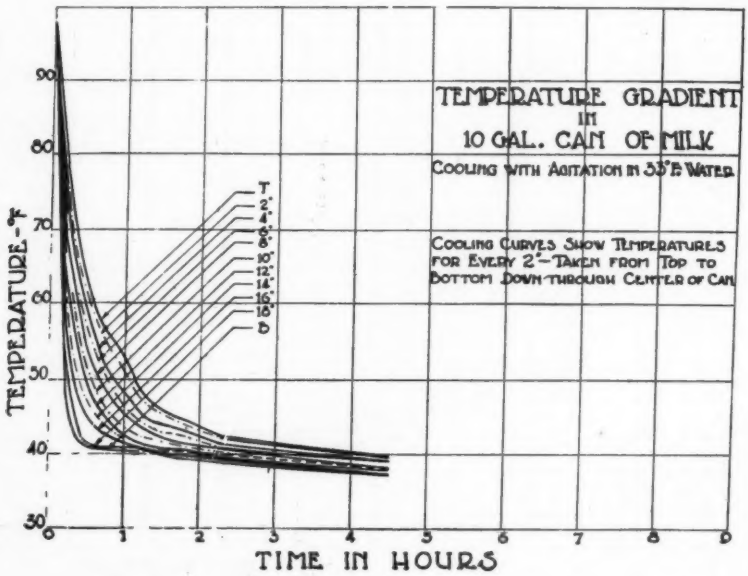
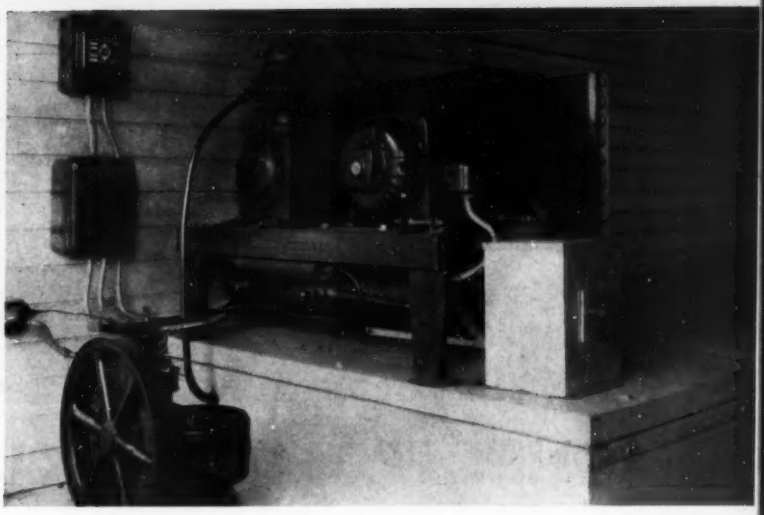


Fig. 2. Showing how much more uniformly milk cools in the same 10-gallon can when the cooling water is agitated. (Compare with Fig. 1.)



Milk cooler installation on the Colo Mont Ranch, Amherst, Mass.. operated by E. I. Shaw who says: "Milk is cooled much quicker and better by mechanical refrigeration in all seasons of the year, and also saves about two hours a day for a man to put in ice."

matter; this may be carried into the cooling water unless the can is rinsed just before immersion. When ice is used, it will be necessary to change water more frequently, especially if the ice is placed directly into the water.

All cabinet covers should be of light construction. If a large tank is used the cover should be in two sections. One inch of insulation is enough for the cover. A well constructed cover will not need any weather stripping. Constant dampness on the cover will cause the weather stripping to wear. This is seldom replaced soon enough and becomes unsightly.

Mechanical refrigerating machines are either electrically operated or motor driven or driven by a gas engine. When driven by an electric motor they are generally referred to as "electric milk coolers." The essential parts of a milk cooler are the cabinet, the compressor, the condenser, and the power unit. The commercial cabinet is metal lined; the home-made is generally of concrete. If mechanical refrigeration is used, the cabinet is equipped with cooling coils, more properly called evaporating coils. The refrigerant used may be ammonia, sulphur dioxide, methyl chloride, or other gases. The cooling coil for sulphur dioxide and methyl chloride is made of ½-inch copper tubing, as length depends on the size of the cabinet. When ammonia is used the coils are made of iron pipes. All refrigerants commonly used in milk refrigerating plants operate at practically the same efficiency.

Water Cooled Unit Preferred

The condensing unit of the refrigerating machine is either air or water cooled. If running water is readily available a water cooled unit always is to be preferred.

The gas engine driven units are semi-automatic. They will stop, but the engine must be cranked to start. Electrically driven units are automatic in every respect. They require no attention other than the oiling of the motor, probably once a month.

Cooling the milk with ice requires from 40 to 50 pounds of ice per 10-gallon can of milk when it is cooled from 90 degrees to 40 degrees F. The electrical energy required to do the same amount of cooling is approximately 1.75 kw. hr. The actual cost of operation is determined primarily by the requirements of temperature to which milk must be cooled (Table 1). Thus, if milk is to be cooled to only 50 degrees F. instead of 40 degrees F., there is at once 1600 heat units less to handle which, in the case of ice, would mean about 30 to 35 pounds of ice per can instead of 40 to 50. With the electrically operated milk cooler, the operating cost would be reduced from 1.75 to 1.25 kw. hrs.

Table 1

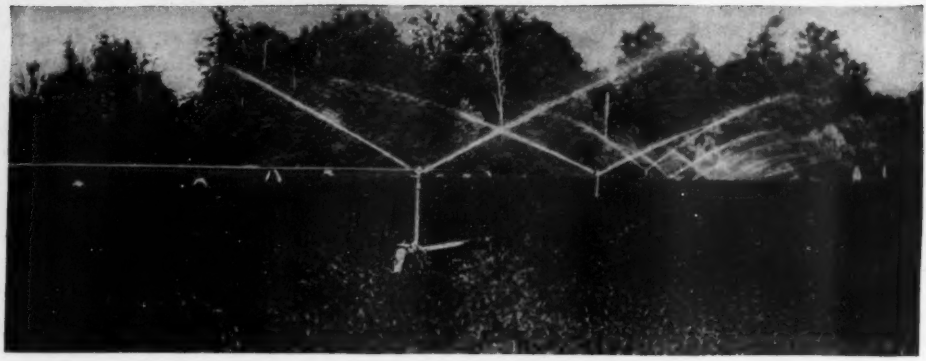
Energy Required in Kw. Hr. per 10-Gallon Can, When the Milk is Initially at 98.6°F. (cow body) Temperature, and the Milk is Cooled to the Temperatures Indicated.

Temperature to Which Milk is Cooled, °F.	Kw. Hr. per 10-Gallon Can
50	1.25
45	1.55
40	1.80
35	2.25

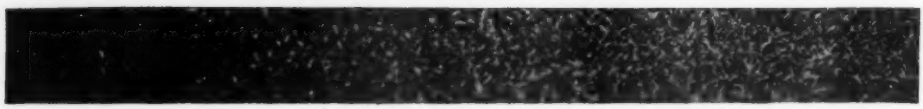
In selecting the size of the milk cooling unit, the dairyman should be governed by the number of cans of milk to be cooled in twenty-four hours based on extreme summer conditions. It is more economical in the long run, more satisfactory, and the machine will probably last much longer to over-rate rather than under-rate the capacity of the milk cooler. A commercial unit is the safest selection, because it comes from an intelligent manufacturer who bases his product on records of past performance, and has arranged for prompt and efficient service in any emergency.

From the dollar and cents alone, the facts concerning the milk cooling problem can well be appreciated and analyzed on the basis of stricter regulations governing the handling of milk, because health authorities insist that milk must be cooled quickly to lower temperatures than has been done in the past.

The present milk cooling systems are efficient and available at low cost. These will insure proper cooling and such a system will last for years. The initial investment can be paid for from the premium obtained for producing high quality milk. There are profits in milk cooling. Milk production is one of the country's most important industries and none is more important from the standpoint of health, especially to the infant and child population.



MONEY FROM ARTIFICIAL RAIN



By C. J. HURD

REVOLVING sprinkler irrigation is a relatively new method to thousands of farmers throughout the country. However, Carl Robertson, field supervisor for the large cooperative cannery at Eugene, Oregon says "During the past two or three years 71 commercial truck farmers in a radius of 15 miles from our cannery have installed revolving sprinklers for irrigation of vegetables for our cannery. Yields have increased about as follows:

"Beets—from 3.5 tons to 9 tons per acre; Carrots —from 17.0 tons to 30 tons per acre; Canning Corn—from 2.5 tons to 4 tons per acre.

"Green beans are not accepted unless they are irrigated." Mr. Robertson reports. "Yields on irrigated Blue Lake variety beans are from 8 to 12 tons per acre."

This district is not the only one that has accepted this type of irrigation. In other parts of Oregon, well over 100 farmers have installed revolving sprinklers. The size of system varies from ½ acre to 100 acres, to irrigate small fruit, vegetable and forage crops.

A few years ago the accepted plan for this type of irrigation was to use hose, and a "grid system" of distribution pipes over the area to be irrigated. This system has now been replaced with less expense for both equipment and labor, with a portable system, whereby only one supply line or "main" as it is called is required across the field with a portable sprinkler line which is moved in uniform intervals across the field attaching this portable line to outlets on the "main."

Say for example, the field is 800 feet long and 400 feet wide, which is a little over 7 acres. If the pump can be located at one end of the field near the center, only 800 feet of supply line and 200 feet of portable sprinkler line is required. Simple, isn't it?

Plan Your System

The secret of good operation is in carefully selecting the equipment. The following suggestions are given, not as hard and fast rules, but as a guide in laying out plans for effective work.

The fact that is requires pressure to operate the sprinklers eliminates using "any old pump." However, excessive pressures are not needed. Pressure costs money, and only enough should be used to do a good job of sprinkling. Design the system so that there will be 30 pounds pressure at the last sprinkler on the line, and with a good irrigation sprinkler there will be good coverage and uniform distribution of water on the ground.

Type of Pump

Centrifugal pumps of the pressure type are the best and least expensive for irrigating if the pump can be located so as to be within fifteen feet, vertical height, of the water. In fact, if the water is within 25 or 30 feet of the surface of the ground, it will pay to dig a pit 15 or 20 feet so as to place the pump within the required 15 feet (centrifugal pumps operate at their highest efficiency when within 15 feet or less of the water). As much as $300.00 can be saved between a centrifugal and a turbine pump of 3 or 5 hp. size by digging this pit.

How Much Water?

In planning a revolving sprinkler irrigation system, the most important problem is the amount of water necessary. Differing from a flood system, the minimum quantity that can be used and still get over the ground satisfactorily should be used.

Left: Irrigating 18 acres of peppermint, pump being operated by a 5 HP. motor.

Right: An electric motor, direct connected to a centrifugal pump, is ideal for pressure systems.

Below: A portable irrigation system is used at the Harold Tompkins truck farm, Dayton, Oregon.

This reduces the size of pump, motor and pipe required. I have seen practical installations that are operated 20 hours a day during the entire irrigation season. Long hour operation means low average electric rates, and a low per acre operating cost.

The first consideration is how much water is to be applied, for each application, and how many applications are needed a month. To make this calculation easy, a table is included from which can be figured accurately the amount of water that will be needed.

To illustrate how to use this table: Say 10 acres are to be irrigated and it is desired to apply 2 inches of water every 12 days. From this table it will be found that it takes 4.7 gallons per minute per acre or a 47 gallons per minute pump for the 10 acre system.

This shows how small a quantity of water is needed, if operated over long hours. Shorter hour operation will take a correspondingly larger pump.

Pressure Is Important

The pressure does not need to be more than 30 pounds at the last sprinkler on the line. Any higher pressure means higher power bills. Many installations are made without taking this into consideration, resulting in materially higher power costs.

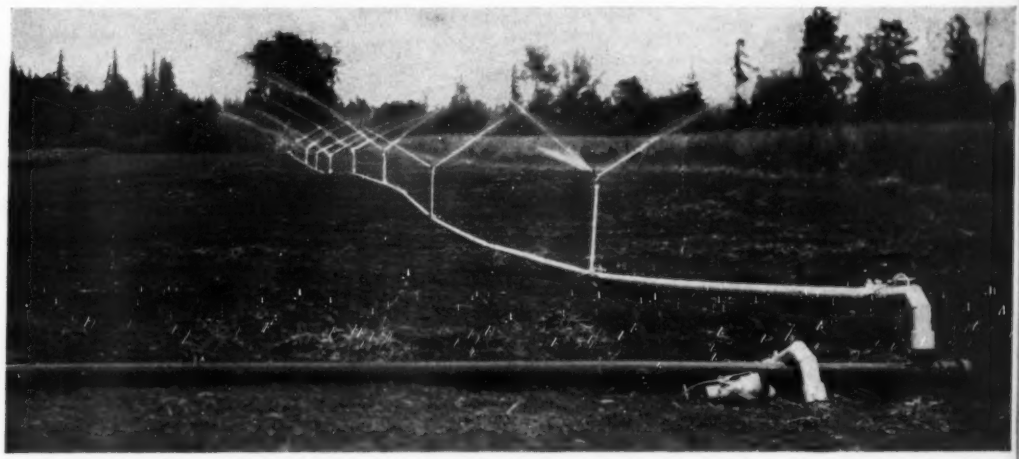
Gallons Per Acre Required For Overhead Irrigation

(Sprinklers Operating 18 Hours a Day)

Courtesy California Corrugated Culvert Company

Number of Days Required per Irrigation	Inches of Water Applied				
	1"	1½"	2"	2½"	3"
7	4.0	6.1	8.1	10.1	12.1
8	3.5	5.4	7.1	8.9	10.6
9	3.1	4.8	6.4	7.9	9.5
10	2.8	4.3	5.7	7.1	8.5
11	2.6	3.9	5.2	6.5	7.7
12	2.3	3.6	4.7	5.9	7.1
13	2.2	3.3	4.4	5.5	6.5
14	2.0	3.1	4.1	5.1	6.1

An actual test made last summer showed that an installation operating at 40 pounds pressure at the



RANDOM SHOTS AROU

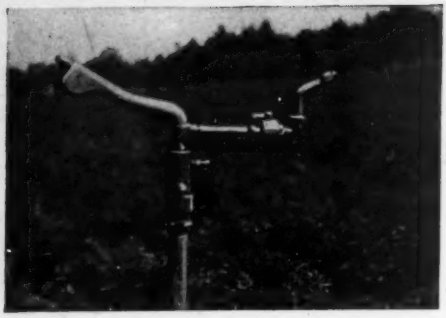
Upper row (left to ri[illegible]l: A[illegible] uses his feet to rid the clothes of maiden baking holiday delicacies some of the cakes may be seen in children of Zell Am See, a famous public fountain to g

Lower row (left to right): Chinese wo or three weeks growth for transplan children of Whakarewarewa enjoy a b which is supplied with hot water from the family wash on the banks of a

AROUND THE WORLD

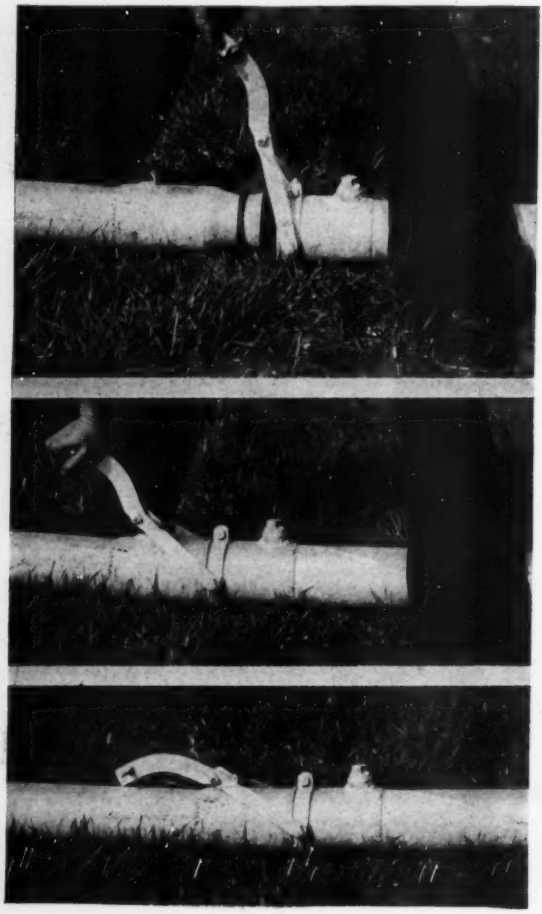
l: A Madgascar laundryman who clothes or dirt; A Czecho Slovakia elicacies over an open wood fire; e seen in the foreground; Austrian famous resort in Tyrol, pause at a ntain to get a drink

Chinese women taking up rice of two transplanting in the fields; Maori enjoy a bath in their natural bathtub ater from nearby hot springs; Doing ks of a canal near Batavia, Java.



Above: Close-up of a sprinkler unit.

Below: Sprinkler lines are connected easily and quickly.



sprinklers increased the farmer's electric bill 33 per cent over that where the sprinklers operated at 30 pounds pressure.

Main Line Pipe

Main line pipe can be of any type that can be obtained at a reasonable cost, so long as it is of the proper size and able to stand 35 to 40 pounds pressure without leaking. Ofttimes reclaimed boiler tubing, or used iron pipe will be satisfactory. Last summer in Oregon several farmers bought wood pipe from a nearby city that was improving its water system. Pipe companies also sell black steel pipe, treated with hot asphalt that is reasonable in cost.

Friction to the flow of water in pipes varies with various sizes and kinds of pipe. In selecting the size of pipe to use have the irrigation pipe representative figure the total friction loss for several sizes, and have him express this in pounds pressure lost. When he does this, it will be very apparent which size to use. In general it is not desirable to have more than 5 pounds pressure loss from the pump to the sprinkler.

Portable light weight sprinkler pipe is now sold in nearly every section of the United States. It usually is sold in 20 foot sections with a "quick" coupling, and an outlet every 20 feet for a sprinkler. Pipe sizes are from 2" to 6", which takes in the range required for one acre to one hundred or more acres. Prices and specifications can be obtained from the manufacturer or his representative.

Selecting Sprinklers

A well designed irrigation sprinkler will cover an 80 to 90-foot diameter circle operating on 30 pounds pressure, and give uniform water distribution. Capacities of these sprinklers can be from 3 to 30 gallons per minute, depending on size of nozzles used.

In planning the system, select sprinklers and their capacity according to the length of sprinkler line to be used and the rate at which is to be applied. If for example a 200-foot sprinkler line is to be used, and the pump capacity is 50 gallons per minute, the selection will probably be five 10-gallon per minute sprinklers (40 foot spacing). If the sprinkler line is 360 feet long it will be desirable to use six 8-gallon per minute sprinklers (60 foot spacing). In other words, there is a sprinkler for every set of conditions encountered.

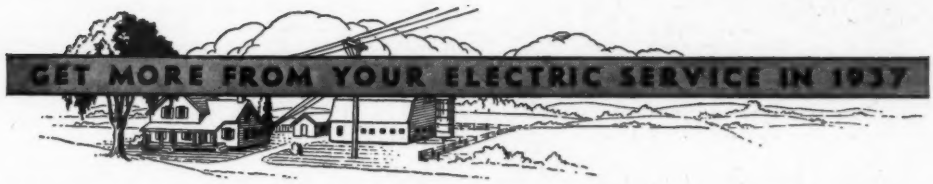
An easy equation to use in figuring the rate of application of water with any size of sprinkler is:

$$\text{Inches per hour} = \frac{96 \times \text{G.P.M. of sprinkler}}{C \times S}$$

c = distance in feet between sprinklers on line
s = distance in feet that sprinkler line is moved

Using the first example, if 10-gallons per minute sprinklers are being used, with 40 foot spacing and the sprinkler line is moved 50 feet each time, this will figure with the above equation, a rate of $\frac{96 \times 10}{40 \times 50}$ or .48 inches per hour. To put on three inches of water then the sprinklers would be left in one place for about 6 hours. From this equation any set of conditions can be figured.

Power company agricultural engineers and the state college irrigation specialist will gladly assist in planning irrigation systems. Plan now and reap a truly golden harvest next summer with the aid of a modern irrigation system.



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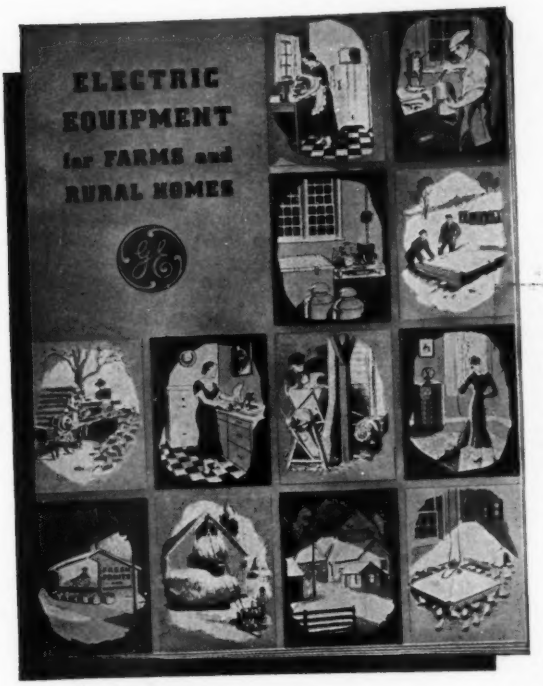

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Dept. 6—201, Schenectady, N. Y.

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ELECTRICAL HOUSEKEEPING

Conducted by
GAIL MEREDITH

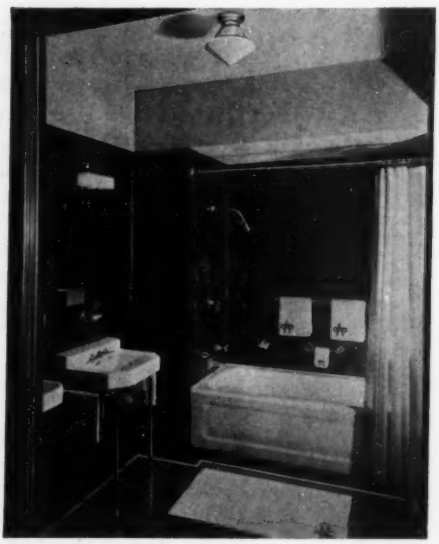
THE RIGHT LIGHT IN THE BATHROOM

IT is particularly important to have a good light in the bathroom. We use artificial light there so much of the time.

If we plan our lighting well, it will add to the comfort and to the convenience of all the family. My husband has just begun to wear glasses for reading and through some chance he had them on when he started to shave the other day. He came out of the bathroom jubilant.

"Do you know I haven't had such a shave in six months"" he crowed. "I didn't realize how much difference it makes if you can just see what you are doing."

That is the chief aim of bathroom lighting, of course, light enough to see in the mirror not only for shaving but for feminine make up, too. Light enough in the medicine cabinet to read labels, light enough throughout the room to scrub grubby, five year old boys.



Above: A bathroom of ordinary size requires a ceiling light as well as a mirror light.

Right: Good mirror light is essential for the entire family.

For a very small bathroom the mirror lighting may be all that is needed for the room, but in a bathroom of ordinary size, there should be a ceiling light, too. A 75 or 100 watt bulb should be enclosed in a glass globe of some kind and controlled by a switch at the door.

When we are planning the lighting it is just as well to remember the walls have their effect on the light in the room, too. Dark colors, you know, do absorb a good deal of light, and light colors reflect it back into the room. Light falling on shiny walls and woodwork may give glaring reflections that are unpleasant to live with. So light walls, dull in finish, offer the best background for our light.

If you are one of those fortunate people who are building a new home this year, planning the lighting is an easy job. If you will remember that the whole job of your overhead light is to give you even, plentiful light throughout the room, you will select your fixture wisely.

Possibilities for Mirror Lighting

There are several possibilities for the mirror. That is the spot where you need special and rather intense light. You can get it by a pair of bracket lamps on either side of the mirror. These lamps are best with glass shades open at the top. They ought to be set about face height from the floor. And if you ask me whether it is to be your face or your husband's face, I refuse to take sides. The lighting experts say about 60 to 66 inches from the floor.

Long tubular lights at the side of the mirror or above it, lights covered with a frosted glass that does away with all glare give excellent mirror lighting.

Then there is the light directly in the center and at the top of the mirror. You will get this right if you remember that these mirror lights should light up the person standing in front of the mirror, but should not, themselves, be reflected in it.

If these lamps at the mirror have 40-60 watt bulbs, they will give you a good light.

It is no very great task for an electrician to make the changes necessary in your bathroom even if you did start out without enough light. You may even be able to fix up the matter yourself

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The worlds simplest electric pump—ONLY ONE MOVING PART—Operates without metal-to-metal contact. Nothing to get out of order —Nothing to wear.

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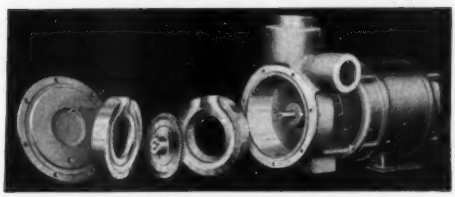

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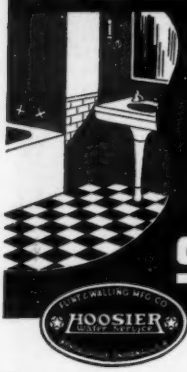

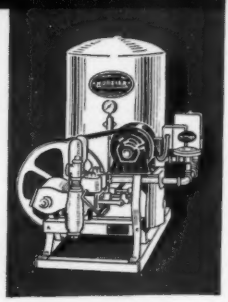

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if you have a couple of convenient outlets in the right wall. Various pin-it-up lamps can be hung at the side of the mirror, lights with shades, or the tubular frosted lumilines with cord and switch attached.

• • •

DON'T
BLAME THE FUSE PLUG

WHEN my cousin's baby was learning to walk, she tumbled about over everything. A dozen times a day her angry wail would bring her mother on the run.

"Nassy old table," Beth would say reproachfully, kneeling beside the child. "Did it hurt the baby? Mummy'll hit it; that's what she will."

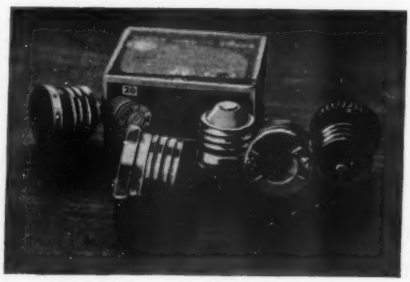
And ten to one, Beth's vigorous slaps at the table leg would divert the baby until she forgot to cry and joined in striking it with her tiny doubled up fist.

It always seems to me that may be one reason why "somebody or something else" is always to blame for anything that happens to that girl now. She has grown into the sort of a person who always blames the fuse plug when the lights go out.

This, I think you will agree with me, is even more illogical than it was to punish the table when she stumbled against it. It is the business of a fuse plug to burn out when something goes wrong.

A fuse is nothing whatever but a safety device set in an electric wiring system to prevent using more current than the wires can safely carry.

You know what a fuse looks like, of course, just a strip of metal encased in a porcelain or glass plug, or strung in a fibre cylinder that looks much like a cartridge. The ordinary fuse plug screws into a socket in the fuse box panel. That soft strip of metal is the working part of the con-



trivance. A section of it actually burns up at a certain temperature—"blows," the electrician says.

There are several ways of blowing a fuse.

The first, and probably the most common is just by overloading the circuit it protects. Each separate circuit in your house wiring is built to carry a certain definite load. What that load should be will differ with the electrical code in your community.

Suppose we say 1650 watts.

It was a circuit like that overloaded just the

other day. I had stayed overnight with the Bestors, and was coming back home with the children when they drove in to school in the morning. We were at breakfast and of course it was so

(*Continued on page 25*)

For March

YOU would never believe how many things women hate to do? Mrs. John E. Speer doesn't like to wash dishes. You can see she doesn't from her letter.

Next time we had better interest ourselves in chickens. How about a letter, 200 or 500, as you like, on "This is the Way I raise my Chickens"? We will pay you $5.00 for the letter we print. The letter should be in by the 20th of March, and address it to Gail Meredith, 1026 Seminole Highway, Madison, Wis.

Mrs. Speer's letter follows:

"This Is the Job I Dislike Most"

Dear Editor:

When I was a very little girl they tied an apron around my middle and set me on a box to wash dishes. I hated it passionately; I still do! I washed them for fifteen years for a father and a house full of brothers, and then I got bit by romance and married a ready-made family of males with huge appetites and big businesses—especially just after dinner.

Dish washing *has* to be done, and I have tried everything on it; I've set red geraniums in my kitchen window and watched them grow while I swirled the suds; it was still nasty work. I've stacked them up so I would have to do them only once a day, but the thoughts of that mountain of dishes waiting for me have tormented me—they're harder to do too (if possible). I have used paper cups and plates that leaked and broke, and caused orgies of swearing among my family—they just aren't perfected yet (I refer to the paper dishes, not my family). I have turned the radio on and tried to be uplifted by music or drama while I plunged the plates in and out, but it was still drudgery and my freshly-done finger nails peeled just the same. One thing, I haven't been psychoanalyzed yet. Do you suppose a psychoanalyst could find a heap of dirty, ash-filled cups and some greasy dish water far down in my sub-conscious, clear it out, and then I would like dish washing?

I think a far better way would be for you to award me this $5.00 prize money and let me make a down payment on a shiny new electric dish washer. If I could ever get one in the house, I'd convince my men folk they were able to keep up the payments!

Dishragishly yours,
MILDRED CRABTREE SPEER
(MRS. JOHN E. SPEER)
Amarillo, Texas.

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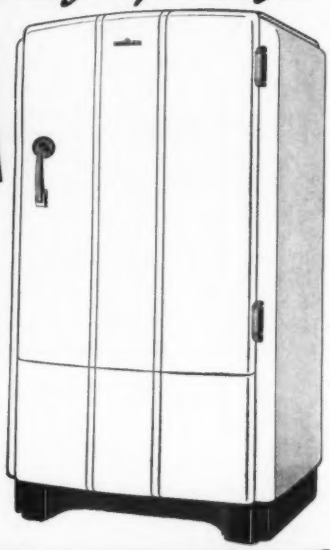

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early that lights were on in the dining room and kitchen. Nan was making coffee in the percolator and Bill, the twelve year old, was watching the toast.

Nan had just handed me a second cup, I remember, and I was actually pouring the cream into it when everything went dark. I kept right on pouring, I discovered afterwards, but that really is not part of the story.

"Hey, Mom, What did you do?" called Bill, shrilly.

"Nothing," answered his mother, from the kitchen. "I just thought I'd get a load of these white clothes going, and the minute I plugged that washer in, the lights went out. I can't think what is the matter."

But it did not take much figuring to discover that there were a 150 and a 100 and three 60 watt lamps burning. That the percolator used 550 and the toaster 660. That ran the load to 1640 watts right there. Asking for 300 or more for the washer put on a good sized overload, enough to burn off that soft wire in the little porcelain plug instantly.

The coffee was really done, so Nan disconnected the coffee maker. Bill pulled out the plug of the toaster and Mrs. Bestor started the washer as soon as Bill got the new plug in place.

A short circuit will blow a fuse, too. You get a short circuit, in case you have forgotten, when the electricity leaves the useful path you have provided for it and goes flashing off home by some easier route.

When the insulation on the wires of a cord is worn through and the wires rub against each other, instead of going the full length of the cord

Bad Business. This lamp needs a new cord.

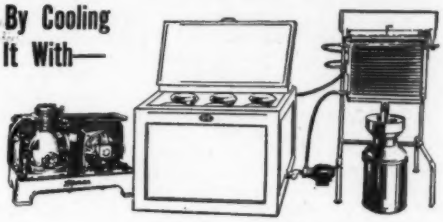
through the wiring of the appliance, that current will skip across from one wire to the other and start back.

If the ends of two wires in a plug come loose so they can touch each other, the current jumps across there. If anyone you know should be so short sighted as to poke at the wires of a toaster with a metal fork, he might cause a short circuit. And folks who pin up cords to the wall or a door casing with thumb tacks sometimes find themselves with a short circuit sizzling the cover off the wires and scorching the woodwork because the tack broke through the insulation and made a bridge between the wires for the current.

In all of these cases of short circuit the current

MAKE MORE MONEY FROM YOUR MILK

By Cooling It With—



Lipman

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If you milk 4 or more cows it will pay you to protect your profits and reputation with the right kind and amount of refrigeration—LIPMAN Automatic Refrigeration—that:

(1) Cools milk quickly, below 50°.
(2) Keeps down bacteria count.
(3) Prevents spoilage, rejects, penalties and exclusion from best markets.
(4) Earns premium grade prices.
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finds an easier path to travel and therefore it flows in greater quantity than was intended. But before it can do any real harm the fuse will blow if it is the proper size.

It must never be able to carry more current than the circuit it is meant to protect.

The next possibility of blowing a fuse may come when you overload a motor. I suppose the washing machine is the most frequent offender.

There I go, shouting "nassy old table" myself.

The washing machine is not to blame. Under ordinary conditions its motor takes very little current. At starting it does take a little more than it does when it gets to running, but still not any great amount. But suppose you trip on the cord and pull out the plug while the washer is going, or when you are running a pair of overalls through the wringer.

If you shut off the machine before you push the plug in again, well and good. But, it, in your haste, you just shoved the plug back, the effort of that motor to get under way with the washer sloshing a tubful of clothes around calls for so much electricity that it often blows a fuse.

And it does it, you want to remember, before the extra load could do any harm to your motor, or could have done any harm to your toaster, to the wiring, or to the walls through which the wires pass.

To make sure of this protection you use only fuse plugs that have the approval of the National Board of Fire Underwriters; and if you are wise, you keep an extra supply on hand. There is no safe substitute for a fuse plug.

Putting in a new one is a simple job. Just how simple depends on where the fuse box hangs. In old houses it is very apt to hide away in the northeast corner of the basement, to be reached only by threading your way between the coal bin and the screen doors, past the furnace and the fruit cellar, and by climbing at the last over a dusty, slippery pile of trunks.

You need a flash light and you need a box or a dry board to stand on, wood to keep you off the damp basement floor. Throw the light on the names below the sockets for the fuses till you come to the name of the circuit that is out.

Pull the main switch.

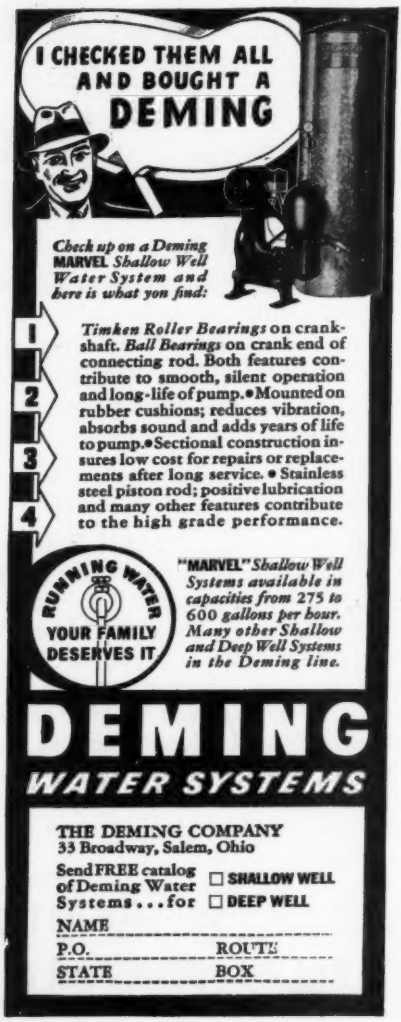
Then with one hand unscrew the plug from its socket, lay it down, and screw in the new one. Still with one hand. Guard against getting your fingers into the socket, and remember to keep on the box or board while you are changing the fuse. And don't hang on to the conduits or other metal parts. Keep your free hand free.

I hope you aren't going to tell me that your circuits aren't marked and you have to screw out one plug after another, trying the new plug in each socket till the lights come on!

If your electricity was put in later, the fuse box is more likely to be in the back hall where you can get at it easily. Or, if you are more modern still, you may have a wiring system that has substituted a circuit breaker for the old fashioned fuses.

This is a box with a number of switches built to cut off the circuits automatically whenever there is too much current going through. One of these switches acts just like the fuse, you see, only there is nothing to replace. When you have taken off the overload or found the short circuit, you can push the switch back in place, and that is all there is to it.

Of course a fuse always blows at the wrong time. There is no right time to have the current go off. Remember, though, that when it does blow, it warns you of something wrong, and takes prompt steps to prevent any harm coming of it. So it seems hardly fair, does it, to blame the fuse plug.


I CHECKED THEM ALL AND BOUGHT A DEMING
Check up on a Deming MARVEL Shallow Well Water System and here is what you find:
1
2
3
4
Timken Roller Bearings on crankshaft. Ball Bearings on crank end of connecting rod. Both features contribute to smooth, silent operation and long-life of pump. • Mounted on rubber cushions; reduces vibration, absorbs sound and adds years of life to pump. • Sectional construction insures low cost for repairs or replacements after long service. • Stainless steel piston rod; positive lubrication and many other features contribute to the high grade performance.
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STATE BOX

Mostly from Swallows

Freshman: "Where do jailbirds come from?"
Soph: "They are raised from larks, bats, and swallows."

On the Right Road

They had lost their way in their new and expensive car.

"There's a sign, dear," she said to her husband, who got out of the car and flashed his flashlight on the board.

He read: "To the Poorhouse."

"Yes," he answered. "We're on the right road and we didn't know it."

ON THE AIR

Conducted by JEROME J. HENRY

Veteran at Eleven

LUCY GILLMAN, with the red curls and gray eyes, is the 11-year-old veteran radio actress who plays the part of Lucy Moran in "Today's Children." She's been playing the role since the day of the first broadcast on June 30, 1932. The popular feature is heard daily expect Saturday and Sunday.

• • •

Makes Radio a Steady Job

SALLY SINGER hasn't had many idle moments since she made her professional radio debut less than 20 months ago. Not one week has gone by in which she has not been scheduled for at least one network broadcast.

She got her first opportunity to sing before a theatre audience four years ago in a small New York town. She won a radio audition contest in Albany. An audition at station WGY, Schenectady followed and Sally began her radio career.

Sally is a picture of confidence and assurance. The microphone has never frightened her.

• • •

Baby Gets Most Fan Mail

LULU BELLE and Scotty, National Barn Dance stars, pooh-pooh the idea that when a star marries his troubles begin. When a fan recently asked them which member of the family receives the most fan mail, they looked at each other, chuckled and said, "Reckon mebbe it's Linda Lou, our 10-month old baby daughter."

As a matter of fact marriage has meant much to Lulu Belle and Scotty as radio stars. When they were first teamed together, officials feared marriage for them might not be a good idea. But as soon as they were married their fan mail began to increase. With the birth of Linda Lou, a new character entered the picture. Gifts of every description poured into the household.

One fan sent a wood carving showing Scotty playing his 5-string guitar and rocking Linda Lou's cradle with his feet.

• • •

A View of Mighty Allen Art Players

FOR several months Fred Allen has been adding insult to anonymity by introducing his Mighty Allen Art Players as "scarecrows in the field of drama," "the only troupe to play on Broadway and have their second act intermission win the Pulitzer prize," "the first players to transplant the razzberry from the bush to the radio studio," etc.

Officially, the Mighty Allen Art Players are four, Minerva Pious, Eileen Douglas, John Brown and Charles Cantor.

Smallest in size but by no means the least in ability is Min Pious. She plays the little girls, Irish cooks, hillbilly women, and features Russian dialect. Born in Moscow 27 years ago and educated in schools of all sorts from Vienna to Bridgeport, Connecticut, including stopovers at Paris, London, and New York, Miss Pious is well

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Slightly higher with larger tank and in larger sizes.

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More dependable disposal . . . plus GREATER SAFETY for your health . . . especially on farms where spring or well water is liable to become contaminated from an inadequate or unreliable septic system. The San-Equip Master Septic Tank gives years of trouble-free service.

New type intake lessens danger of clogging. Don't risk dug-up lawns . . . or walls, furnishings and floors damaged by clogged drains. Fresh air intake extending above ground permanently marks location of tank . . . provides access to intake without digging. House line is automatically vented, sealed against dangerous unpleasant gases. Requires less digging. Lowers installation cost. Other exclusive features.

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WRITE for these books: (1) The Home Workshop, *free*; (2) What to Make on the Lathe, *10c*; (3) How to Run a Lathe, 160 pages, *25c*. Coin or stamps accepted. Any South Bend Screw Cutting Lathe on easy terms. Priced from $85 up.

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ELECTRIC BROODER
Heavier Chicks—Less Losses—Reduces Operating Costs 30%
Saves Labor—No Fire Hazard
Be sure to get the whole story about Electric Brooding
Write for Literature and Prices
The TRUMBULL ELECTRIC MFG. CO.
1012 Woodford Ave. — Plainville, Conn.
A GENERAL ELECTRIC ORGANIZATION

equipped to cope with any character role that she might be asked to play.

She made her radio debut as a piano accompanist for vocalists. A mutual friend persuaded Fred Allen to let her do her Russian dialect for him. And she stayed with his show.

Tall, blue-eyed Eileen Douglas towers over tiny Miss Pious when they are at the microphones. Eilene portrays gangster's girl friends, pompous society women, and proud mothers of precocious children.

John Brown is best remembered as the English butler, but he can do almost any kind of voice or dialect. He comes by his British accent honestly, as he was born in Hull, England.

Charles Cantor was brought to the show to replace Jack Smart, who went to Hollywood. He was born at Worcester, Massachusetts, and was a vaudeville contemporary of Allen.

Electric Brooding Saves Money

Brooding of chicks on the farm is fast being modernized with the installation of electric brooders, which have many advantages over old oil and coal brooders.

One practical illustration of the advantage of this development is the experience of F. A. Brenner, an industrial executive in South Bend, who has made the production of poultry eggs one of his hobbies. Last year he added an electric brooder to the nine oil brooders he was already using and conducted a careful analysis of the costs of operation. He found that his electric brooder cost him approximately $5.40 less than the average of the oil brooders, with the result that this year he has discarded his oil stoves and is replacing these with twelve more electric brooders for the current season. His first electric brooder was installed last March and the cost of operation from March 3rd to April 30th was $4.42 while his oil brooders averaged more.

Regarding his electric brooder, Mr. Brenner says: "We are highly satisfied with the results and, above all, the cost to operate it. We placed 425 baby chicks in the brooder home and produced the finest pullets we ever raised."

The brooder he used is made in two sizes and allows 7 square inches per chick, as recommended by Purdue University. Feeding and watering can be done underneath the brooder, which is equipped with electric heat units, and chrome steel reflectors. It is fully insulated and has ventilators at each end.

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Grind your feed with electricity for as low as ½c per 100 pounds. Write for circular and prices of our Feed Grinders for automatic operation. They elevate grain and feed if desired.

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Questions and Answers

Conducted by R. U. BLASINGAME

Car Starter

Question: *Is there an appliance that I could get so that I could start my car from the* 110 *volt current in cold weather?* H. R.

Answer: Electrical appliances to aid in starting automobile engines during cold weather are available. With these devices the engine may be kept at a higher temperature than the garage in which the car is stored. However, such devices are only effective when the car is parked where current is available, but they are a great aid to starting when the car is stored in an unheated garage.

A well charged battery is essential to easy starting of an automobile during cold weather. With a small battery charger, a number of which are available, it is an easy matter to charge a battery during the night. The battery may also be charged with an automobile battery generator and a 1-4 h. p. electric motor for driving the generator.

On many cars the belt which drives the generator can be slipped off the generator pulley and the electric motor connected to it by use of a suitable belt. The electric motor driving the generator can then be used to charge the battery without running the automobile engine.

Motorizing a Meat Grinder

Question: *I have a* 1/6 *HP motor that I wish to use to run a grindstone or emery wheel. In the October issue, page* 10, *there is shown a hook-up that I would like described in detail. Could I use this hook-up for a meat grinder? Also what size should be used?*

We have read ELECTRICITY ON THE FARM *for the past five years and enjoy it. I have put into practice several of the different ideas gleaned from its pages.* J. McK.

Answer: The grinder, which was described by Mr. Roehl in the October, 1936, issue of ELECTRICITY ON THE FARM consists of a power grinder head connected by a "V" belt to a ¼-horse

(*Continued on page* 30)

Speediest . . . Easiest to handle

ANIMAL CLIPPER

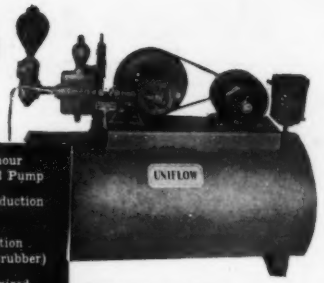
World-Famous

STEWART CLIPMASTER

Has two to five times as much power as other clippers of this type.

Over 90% of the world's clipper users own and PREFER STEWART clippers. **CLIPMASTER is faster, cooler running, easier-to-use.** Lasts longer. Stays sharp longer. Fan-cooled, ball-bearing motor exclusive Stewart design. Completely insulated in the special **EASY-GRIP** handle barely 2 inches in diameter. The finest, most enduring clipper ever made for cows, horses, dogs, mules, etc. **A $25.00 value for only $16.95** complete. Slightly higher west of Denver. 100-120 volts. Special voltages slightly higher. At your dealer's or send $1.00. Pay balance on arrival. Send for FREE catalog of Stewart electric and hand power Clipping and Shearing machines. Made and guaranteed by Chicago Flexible Shaft Company, 5324 Roosevelt Rd., Chicago, Illinois, **47 years making Quality products.**

$66.00



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IT'S SO QUIET that all you can hear is the swish of the water when the pump is working. The Gem "30" is the finest Shallow Well System that we make and we guarantee that you will be delighted with its good performance. . . . $66.00 makes the Gem "30" a real value.

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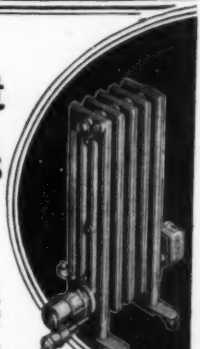


COSTS no more than an electric iron to run. No odor. No smudge. For bathrooms or any room where you now may need some extra heat, this portable electric - steam radiator is just the thing. Ideal for those cool days and damp ones too, in early Fall or late Spring, when for an hour or so you want heat. Just plug the cord in and in a jiffy heat is yours. Comes filled with right amount of water ready for immediate use. Is thermostat-controlled. Also has automatic current shut-off, insuring economy and safety. Being on casters can be easily moved from one room to another. It is a regular little high-efficiency steam plant. Made in 4 sizes. Send for special printed folder C, giving full particulars. On display at **Burden Ind. Appl. Corp., 50 Church St., N. Y. C.**

Burnham Boiler

CORPORATION
IRVINGTON, NEW YORK

What's New

Reviewed by T. E. HIENTON

Names and addresses of manufacturers of the articles described in this column will gladly be furnished upon request. Address your requests to What's New Department, ELECTRICITY ON THE FARM, *24 West 40th Street, New York, N. Y.*

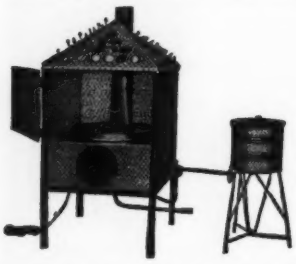
Drill Press

March days afford farmers in the corn and wheat belts of the United States the final chance to check over the farm machinery and get it into shape for the season's work immediately ahead. Repairs to buildings or machinery, new structures or equipment usually require the drilling of numerous holes in wood or metal. A motor-driven drill press, when available on the farm, saves time and labor in drilling such holes.

A new 11-inch drill press which would be found practical on many farms was recently announced by a manufacturer of the Middle West. This drill press is 34½ inches high, 11¾ inches wide, and 19 inches front to back. The maximum distance from chuck to table is 10⅛ inches and from chuck to base is 14 inches. The chuck will take drills for metal work up to 17/32-inch diameter, and all standard wood bits with ½-inch shanks. Power recommended for the drill press is a ⅓-horsepower repulsion-induction 110-220-volt motor.

Heat Circulator

Small amounts of heat uniformly distributed are often advantageous in poultry houses and seed corn drying rooms. Experiments have shown that extremely low temperatures during winter months are often accompanied by corresponding slumps in egg production. Such variations in production have been eliminated through the use of artificial heat in the laying houses. Warm air, circulated in a room where freshly harvested seed corn has been stored, aids in removal of moisture from the corn, thereby diminishing danger from freezing and reduction of germination.



A new heat circulator, developed by a middle western manufacturer of poultry equipment, is designed particularly for use in poultry houses, battery brooding rooms and similar locations where uniform temperatures are necessary. A 12-inch electric fan, driven by a 60-watt, 110-volt motor, draws the air from the floor and forces it upward against the heater and out through openings in the top of the canopy through the room. An oil-burning brooder provides heat for the circulated

Questions and Answers

(*Continued from page 29*)

power motor, both mounted on a cast iron frame. The grinder head is equipped with one flat-faced wheel and a sickle wheel, and tool rests. Saw gumming and buffing wheels may also be used.

A 1/6-horse power motor may be used to drive small grinding wheels for light work. However, for sharpening mower knives with a sickle wheel and most other farm grinding jobs a ¼-horse power motor should be used for satisfactory results. Your 1/6-horse power motor may be used to drive a meat grinder. There is not, to my knowledge, a standard rating for the sizes and power requirements of various meat grinders. I suggest that you obtain from a manufacturer recommendations as to the size of meat grinder and size of pulleys to be used with your motor. As the grinder pulley will be large in diameter and the motor pulley small, in order to give the meat grinder the proper speed, a "V" belt should be used with a "V" pulley on the motor and a flat-faced pulley on the grinder. This will prevent belt slippage.

Farm Shop Pays

A farm shop will pay for itself in a short time in enabling prompt repair of farm equipment and saving trips to town. A one-half to one HP. motor is all that is required to operate any of the usual shop tools. The electric cost per month is seldom over 15 cents even on large farms.

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EXTRA PROFITS ARE YOURS WHEN YOU USE LYON ELECTRIC BROODERS. These well proven brooders turn out healthy, hardy chicks at low cost. Write for FREE CATALOG OF ELECTRIC POULTRY SUPPLIES. Fan brooders and other types, incubators, time switches, water heaters, burglar and fire alarms, supplies for home-made equipment. LYON ELECTRIC CO., DEPT. EF, SAN DIEGO, CALIF. Pioneers of Successful Electric Brooding.

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WRITE FOR BROWER'S New Big Supply Catalog and Poultry Guide. Shows largest line of poultry equipment in world; over 425 items; including Electric Fountains, Brooders, Incubators, Lighting Devices. Filled with poultry information. Low prices—Big Savings—Write today. BROWER MFG. CO., Dept. N30, Quincy, Ill.

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COVER TITLE CONTEST

JANUARY COVER

Why Not Participate in This Month's Contest?

HERE ARE THE RULES

Ten cash prizes will be awarded for the 10 best titles for the picture on the front cover of this magazine.

The first prize will be $20 cash, and nine second prizes of $2 in cash will be awarded.

In case of a tie, each winning contestant will receive the full cash prize to which he or she is entitled.

Titles should be brief—the shorter the better.

All members of the farm family to whom this magazine was sent may submit titles, but each contestant may submit only one title.

Question "A" must be answered.

Entries must be sent to the Title Editor, ELECTRICITY ON THE FARM, 6 North Michigan Avenue, Chicago, Illinois, before April 1st.

Winning names and titles will be announced in the May issue.

Send your title on the coupon or make out a similar form on a plain sheet of paper or government postcard.

Awards for January Contest

First Prize — $20

"One toot and a peep
For nineteen thirty-seven's electric heat."

H. E. BOREN, R.F.D. 1, Box 134, Spokane, Wash.

Nine $2.00 Cash Prizes

"For 1937 I am blowing—
For electricity I'll be crowing."
JOHN HUNTER, Clam Falls, Wis.

"First to blow—first to crow for electricity for 1937."
MRS. L. H. LUDWICK, R.F.D. 1, New Sharon, Iowa

"Baby New Year in charming simplicity
Announcing advantages of modern electricity."
MRS. JOHN J. ROTHWELL, R.F.D. 1, Gardner, Kans.

"About to announce—A New Year for the nation
And healthier chicks by electrical incubation."
CHARLES H. PASCHAL, R.F.D. 3, Carrollton, Ga.

"Two of a kind in their youthful simplicity
Shout long and loud for farm electricity."
MRS. FRANK STONEY, R.F.D. 2, Clinton, Wis.

"New Year announces with sparkling eyes
That electric hatched chicks win the prize."
HILDA KASSEN, Spring Valley, Wis.

"Two new arrivals right on time.
Boosters of power from the electric line."
L. R. TATE, R.F.D. 4, Waxahachie, Tex.

"'Up to scratch,' we'd like to say
for we've been raised the electric way!"
MRS. E. A. MECHLING, Route 2, Moorestown, N. J.

"For child or chick on wintry days
Replace the sun with electric rays."
MRS. L. J. GALL, R.F.D. 4, Box 12, Brenham, Wash.

My title for the March Front Cover picture of ELECTRICITY ON THE FARM is .....

.....

.....

.....

(a) Fill in brand name of any of the following ELECTRICALLY operated appliances you now have.

Range	Clothes Washer	Radio .....
Refrigerator	Vacuum Cleaner	Brooder .....
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My name is ..... R.F.D. .....

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3-37

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ONE BILLION
DESCENDANTS!

Hard to imagine—but true. These bacteria cause disease, cause milk to sour, to smell and taste bad. Not a pleasant thought, but one every farmer must face. The ideal solution to the problem is to have an electric milk cooler which will maintain a constant temperature of 40-50 degrees F. It will save you money, too. No waste in meltage, no time spent in hauling and storing.

For complete information as to cost of installing and operating electric milk coolers, consult your local electric company or reputable refrigeration dealer.

Electricity on the Farm

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